



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/813,890

03/31/2004

Tatsuhiro Yabuki

82478-6200

5762

21611 7590 06/22/2007
SNELL & WILMER LLP (OC)
600 ANTON BOULEVARD
SUITE 1400
COSTA MESA, CA 92626

EXAMINER

LAZORCIK, JASON L

ART UNIT

PAPER NUMBER

1731

MAIL DATE

DELIVERY MODE

06/22/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/813,890	Applicant(s) YABUKI ET AL.	
	Examiner Jason L. Lazorcik	Art Unit 1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 20-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-23 is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-17 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

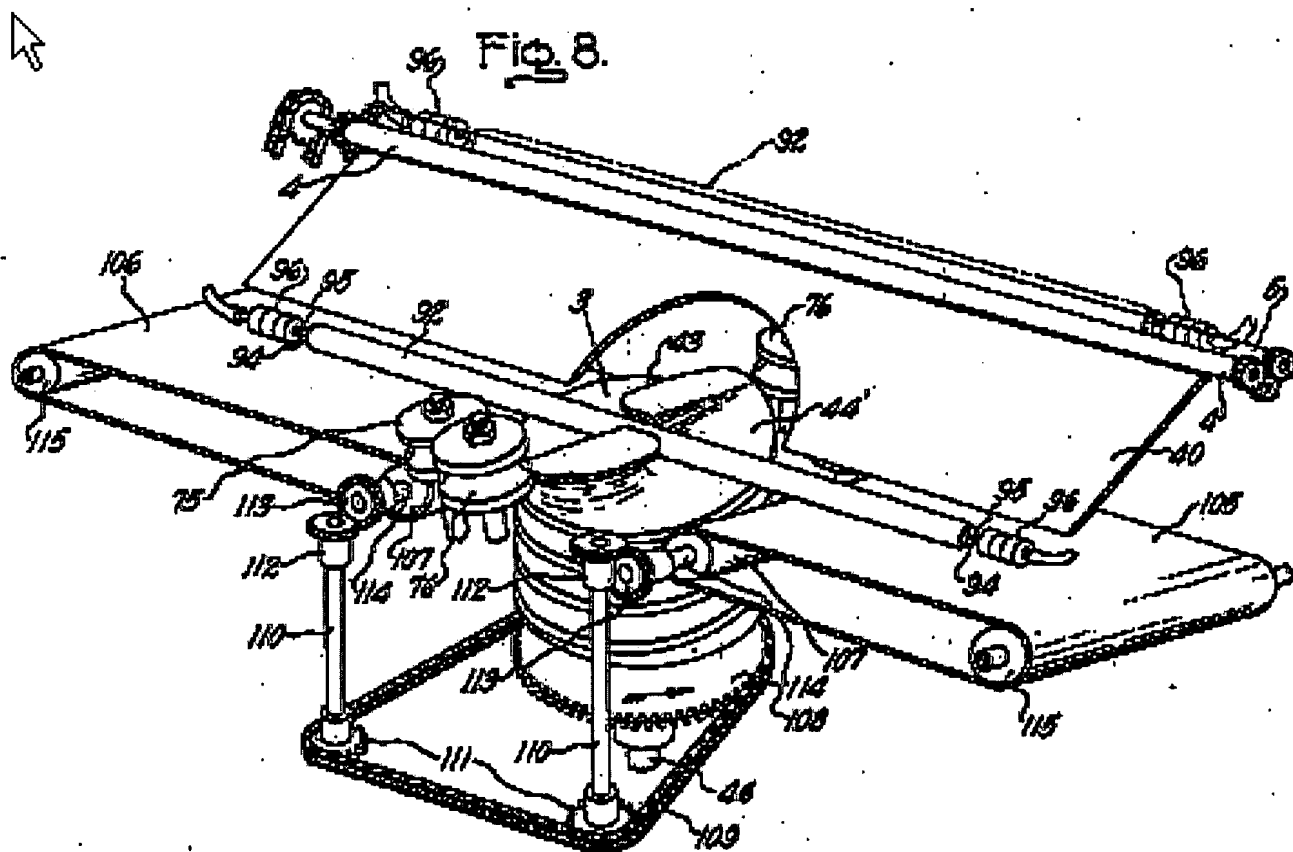
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-7, 12, and 16 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Greiner (US 2,491,857).

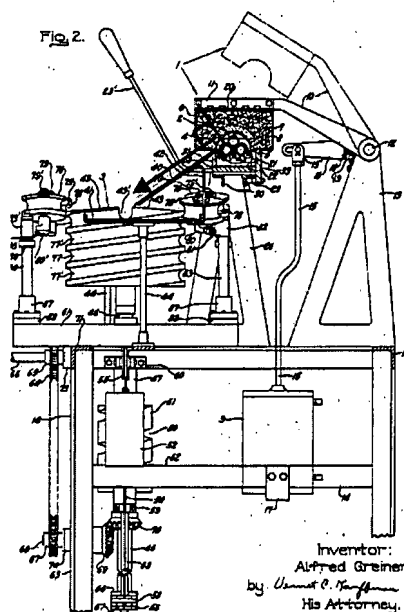
With respect to claim 1 and in particular view of the figure 8 excerpt below, Greiner teaches (Column 1, Lines 1-30) a method of manufacturing a double spiral shaped body from a piece of elongated vitreous stock (92). Said method includes a “hanging and holding step” wherein the “substantially straight” section of elongated stock is lowered in a substantially perpendicular orientation with respect to the “mandrel” (3). As evident from the image, the mandrel is disposed beneath “a substantially center of a double spiral scheduled portion” and that the mandrel extends in a “substantially perpendicular” direction. It is further clear from the image that at least a portion of the softened stock is suspended in a substantially horizontal orientation between support belts (105,106) and that a part thereof sags upon and is “held on a top of the mandrel (3).



The instant reference figures 7 and 12 depict a winding step wherein the glass stock is wound about the mandrel to yield the double helix structure. As further evident in the instant figures, the mandrel provides "winding grooves" along the periphery thereof which correspond to the shape of the formed double spiral". The winding apparatus is further provided with "at least one pair of supporting rollers" (75, 76) which serves to support the softened stock during the winding process. Finally, the instant reference clearly provides for introduction of an internal gas atmosphere while said bend lamb tube is held upon the mandrel in order to maintain the desired tube shape (Column 10, lines 17-31).

Art Unit: 1731

In response to Applicants amendments to Claim 1, Applicants use of the term "perpendicular" to describe the direction of advance of the glass tube from the furnace to a location in contact with the mandrel is interpreted in the broadest reasonable context in accord with Office practice. To this end, "perpendicular" is held in the broadest reasonable interpretation as along a line extending at a right angle with respect to a surface. Therefore with reference to the annotated excerpt Figure 2, Greiner teaches that the heat softened tube is lowered from the heating furnace along substantially perpendicular vector to its location within the heating furnace. As indicated above, the heated and positioned glass tube is "hung" upon the mandrel at a position which is located below the heating furnace.



Claim Rejections - 35 USC § 103

Art Unit: 1731

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2, 3, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greiner as applied to claim 1 and the respective dependent claims under 35 USC 102(b) above.

Specifically regarding Claims 2,3, and 9 Greiner fails to explicitly limit the temperature range of the elongated stock during the stock heating step as set forth by applicant in Claim 2 or that the thermal variance along the length of the stock be limited to +/- 8 degrees centigrade of a target temperature as disclosed in Claim 3. That said, Greiner makes very clear that the length of the vitreous body be heated to a workable state and that there should be a "even distribution of the heat over the entire periphery of the vitreous body (column 1, Lines 24-27). Greiner further indicates that during the heating stage, conditions should be controlled in such a manner as to heat the tubing to a workable condition although not so hot as to cause it to collapse. It would therefore

Art Unit: 1731

have been obvious to one of ordinary skill in the art at the time of the invention to control both the temperature of the elongated stock within the working range (e.g. above softening point) as well as to maintain an even temperature distribution along the length of the elongated stock in such a manner that results in an optimal coiled product.

With respect to Claim 13, Greiner teaches that the guiding rollers (75 and 76) are provided "for directing pressing said vitreous body properly into the grooves of the (mandrel) without distortion" (column 1, Lines 40-42). It is further clear from the elevation figures 2, 7, and 8 that said rollers are inclined at an angle with respect to the horizontal plane defined by the upper surface of the belts (105,106). While the reference fails to provide a specific angle of inclination, absent any unexpected results to the contrary it would have been obvious to one of ordinary skill in the art at the time of the invention to provide said rollers at any angle of inclination that provided the intended "proper" seating of the tubing within the mandrel grooves without deformation.

Claims 10, 11, 14-15, and 17 are also rejected under 35 U.S.C. 103(a) as being prima facie obvious over Greiner as applied to Claim 1 and dependents under 35 USC 102(b) above. With respect to the instant claims, it is noted that the Greiner reference fails explicitly provide a rate of winding higher than the rate at which the chucks advance toward the mandrel. Specifically, Greiner teaches that during the bending operation one should "avoid, as much as possible, all longitudinal lengthening and deformation of said vitreous body" (column 2, Lines 28-30). More specifically, the reference teaches that "the belts (105) and (106) are moved toward the form (3) during (the bending time interval) at a rate designed to advance the end portions of the lamp (92) toward the

Art Unit: 1731

form (3) as rapidly as it is wound thereabout so as to reduce the separate longitudinal movement of said end portions to a minimum and thereby reduce the possibility of any elongation of the lamp (92)” (column 9, lines 61-68).

From the above disclosures, Greiner clearly appreciated the need to balance the lamp winding rate with the translational movement of the lamp end portions in order to avoid deformation of the softened glass body. Further, one of ordinary skill in the art would certainly be apprised of the fact that a compressive force along the axis of a softened vitreous body would tend to bulge or thicken at least a portion said body while a net tensile force would tend to elongate or thin at least a portion of the softened vitreous body. With respect to the instant apparatus, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the gear ratios between for example the apparatus gears 108, 111, 112, and 113 using the well-established theories present in the gearing art (http://en.wikipedia.org/wiki/Gear_ratio). Tailoring these gearing ratios according to the indicated, well established principles would adjust the relative rates of rotation between the mandrel and the belts 105 and 106, consequently affecting the forces imparted upon the softened vitreous body in a deterministic manner. It would therefore have been obvious to one of ordinary skill in the art to optimize the gear ratios in the apparatus in order to optimize the forces imparted upon the vitreous body and thereby “minimize the deformation” of the vitreous body in accord with the teachings of Greiner.

Claim 15 is rendered obvious over the rejections of Claim 1 under 35 USC 102(b) and in further view of the rejection of Claim 13 under 35 USC 103(a) as presented above.

Response to Arguments

Applicant's arguments, see pages 9-10, filed April 11, 2007, with respect to Claim 8 have been fully considered and are persuasive. The rejection of Claim 8 under 35 U.S.C. 112, first paragraph has been withdrawn.

Summary of Applicants Arguments:

1. Applicant argues that Greiner does not teach nor suggest heating only an intermediate portion of the glass tube at a temperature above a softening state that would permit sagging of the tube.

With respect to heating to a softening state, Examiner disagrees. As indicated in the above rejection under 35 USC 103(a), Greiner teaches that the tube is tube is heated to a "workable condition" (Column 4, Lines 62-66) and that an internal pressure may be provided by introducing an inert gas "during heating...to permit ... the obliteration of unavoidable deformations therein" (Column 2, lines 24-37).

Although not explicitly set forth in the Greiner disclosure, it is the Examiners understanding that the reference to "unavoidable deformations" during the heating process strongly suggests that the prior art contemplated heating the tube to a temperature range such that the glass body undergoes deformation

under its own weight (e.g. softening point). Further, Applicant has failed to provide any persuasive arguments suggesting that the claimed working range would not be arrived at through routine process optimization.

Therefore, absent any compelling and substantially unexpected results to the contrary, it is the Examiners position that one of ordinary skill would have been fully capable of optimizing the working temperature for the process. It therefore follows that the limitation of claim 2 wherein the glass tube is heated "within a range between a softening point...and 150 degrees centigrade over the softening point" presents a merely obvious modification over the prior art teachings.

With respect to heating only an intermediate portion of the glass tube, Examiner notes that both the intermediate and end portions of the Greiner tube are heated to the working state. While Applicant appears to imply that the glass tube is heated in a differential manner (e.g. that an intermediate portion is heated to a higher temperature than the end pieces), no such limitation is explicitly required in the instant claims.

Therefore, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., heating only an intermediate portion of the glass tube at a temperature above a softening state) are not recited in the rejected claim(s).

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

2. Applicant argues that Greiner does not teach "releasing" the heated and sagging tube such that it extends downward in a perpendicular direction for mounting on top of the mandrel.

As clearly set forth in the rejection under 35 USC 102(b) above, Greiner teaches heating the tube to a softened state and releasing the heated tube from the furnace such that it advances in a direction substantially perpendicular to the furnace.

3. Applicant argues that Greiner does not contemplate a ratio of rotational winding speed to lateral chuck movement of between 0.6 to 1.0 such that the tube is maintained under slight tension during the winding process.

Examiner disagrees. As set forth in the rejection under 35 USC 103(a) above, Greiner recognized (column 9, lines 61-68) the necessity to balance the rate of glass tube winding with the rate of advance of tube end portions. Although the reference is silent regarding the specific claimed ratio of advance, Greiner

Art Unit: 1731

teaches that the end pieces are advanced at a rate selected to match the rate of winding (e.g. an approximate ratio of 1.0). Greiner further indicates that the separate longitudinal movement of said end portions is held to a "minimum" in order to "reduce", the deformation.

Since the Greiner reference teaches a general relationship between the relative rates of advance and the deformation of the glass tube by elongation or compressive forces during the winding, it is understood that the Greiner reference likewise contemplated rates of advance of approximately 1.0.

Therefore as outlined in the rejection under 35 U.S.C. 103(a) above, It would have been obvious to one of ordinary skill in the art to optimize the relative rates of advance (winding speed vs. linear advance of the end pieces) in the apparatus in order to optimize the forces imparted upon the vitreous body and thereby "minimize the deformation" of the vitreous body in accord with the teachings of Greiner.

Allowable Subject Matter

Claims 20 to 23 are allowed.

With respect to Claims 20-23, the following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not anticipate nor fairly suggest a method of manufacturing a double spiral arc tube wherein

1) the respective end portions of a glass tube are supported while heating an unsupported intermediate portion of the glass tube until said intermediate portion experiences sagging under force of gravity.

2) lowering the heated tube such that the sagging intermediate portion engages with the grooves of a mandrel having a double spiral configuration and winding the heated tube about the mandrel to impart the double spiral configuration there to.

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claim 8, the prior art does not teach nor fairly suggest a step of positioning a heated glass tube with end parts secured by chuck units by "moving the chuck units in a direction that make the chuck units farther apart from each other, along a line that connects one of the chuck units with the other of the chuck units when viewed from a direction toward which an axis of the mandrel extends."

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

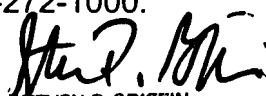
Art Unit: 1731

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Lazorcik whose telephone number is (571) 272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


STEVEN P. GRIFFIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Application/Control Number: 10/813,890

Page 14

Art Unit: 1731

JLL